SOLUTION OF THE LINE FORMATION
PROBLEM BY THE USE OF ITERATION FACTORS

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A new fast–convergent iterative method developed to solve non–LTE line transfer problem will be presented. The simultaneous solution of the radiative transfer and statistical equilibrium equations is performed by an efficient revision of the straightforward Λ iteration scheme.

The improvement of the iterative procedure is achieved by means of the introduction of proper functions - so called iteration factors according to physical considerations. At each iteration step the factors are computed from the current solution and then used to get the new one. In order to warrant stable and fast convergence the iteration factors must be quasi–invariants along the run of the iterative procedure. This is achieved by defining the factors as the proper ratios of two homologous physical quantities, e.g. two radiation field intensity moments.

We will discuss the method on the well–studied instance – spectral line formation in a two–level atomic model as the key–problem for the solution of a much wider range of radiative transfer problems.